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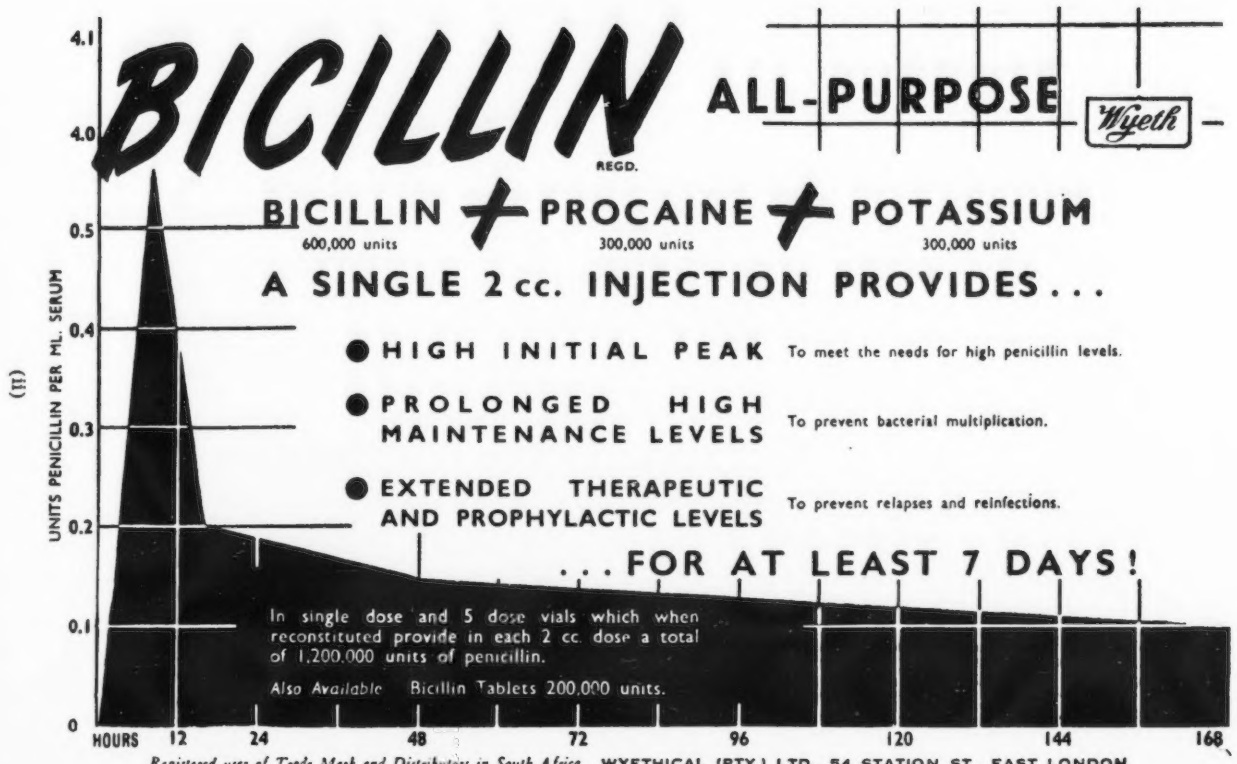

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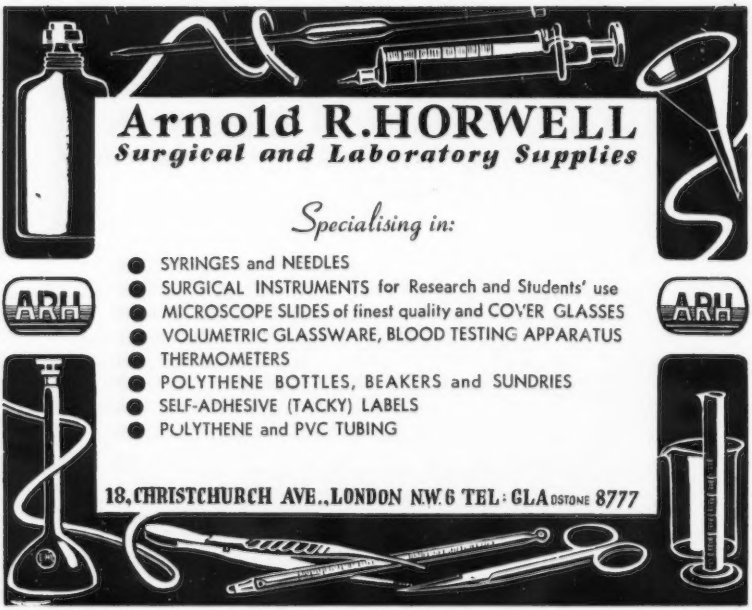
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REDAKSIONEEL

SALARIS SKALE EN NOODHULP DIENSTE

Daar was onlangs heelwat besprekings in die Brittse mediese laboratoriumskringe in verband met salarisskale van tegnoloë. Gedurende die afgelope jaar het die „Whitley Council Committee", wat bestaan het uit verteenwoordigers van tegnoloë en hulle werkgewers, periodiek bymekaar gekom om te onderhandel in verbrand met salarisskale en diensvoorwaardes wat aanneembaar sou wees vir die ondersteuners van albei teenstrydige belange. Die gevolglike ooreenkomste het natuurlik nie algemene tevredenheid veroorsaak nie maar daar was nogtans 'n mate van standardisasie van verdienstes verkry asook eenvormige regulasies in verband met noodhulp dienste.

Mediese tegnoloë in Suidelike Afrika is ongetwyfeld finansieel beter daartoe gedrend as die in Brittanje, vernaamlik as inkomstebelastings in die twee gebiede vergelyk word. Verder ook is ons in vergelyking waarskynlik net so goed beloon as enige groep werkers wat 'n soortgelyke essensiele diens tot die bevolking lewer. Nogtans blyk dit miskien betreurenswaardig dat in die nywerheid waar die hoofgevolg van die werksaamhede die finansiele voordeel van die werkgewer is, blyk die geldelike beloning vir die werker onvermydelik hoër. Daar is 'n aansienlike verskeidenheid in die salarisskale aangebied aan mediese tegnoloë deur verskillende werkgewende liggame. Tot 'n klein mate kan die verskeidenhede verduidelik word deur verskille in lewenskoste in verskeie sentrums, maar die merkbare verskille in salarisse wat somtyds aangebied word in dieselfde dorpe, regverdig ongetwyfeld dat ons vir 'n nasionale skema vir die standardisering van salarisse sal werk. Mediese tegnologie is nie 'n beroep wat dit kan bekostig om twederangse persone aan te stel nie, daar die ander elders anders gelok is deur beter finansiele vooruitsigte.

Die toestand in verbrand met „op roep" dienste in Suid Afrika het ook hersiening nodig. In Brittanje is daar 'n standard graad van besoldiging vir tyd in laboratoriums deurgebring op noodhulpdienste maar hier is daar dikwels geen vergoeding vir soortgelyke werk nie. Onderwyl daar veel mag gesé word vir die opoffering in so'n prysenswaardige doel, bied ons aan dat as die opoffering enige betekenis moet hê dan moet dit vrywillig wees; indien dit egter verpligtend is dan word dit uitbuiting. Dit was voorgestel dat 'n stuksgewyse betaling vir sulke dienste onwenslik sou wees en dat geskikte toepassing op die grondsalaris gemaak sou word. As die voorstel aangeneem word sal die verhoging van salaris 'n direkte verwantskap moet dra tot die tyd wanneer die tegnoloog eerstens sal verwag word om „op roep" te staan, sodat hy sal voel dat sy addisionele verantwoordelikhede behoorlik erken word. 'n Gevoel van ontevredenheid veroorsaak 'n ongesonde atmosfeer in 'n laboratorium.

EDITORIAL

SALARY SCALES AND EMERGENCY DUTIES

There has recently been considerable discussion in British medical laboratory circles about technologists' salary scales. Throughout the last year, meetings of the Whitley Council Committee, composed of representatives of technologists and their employers, have met at intervals to negotiate for salary scales and conditions of service which are mutually acceptable to the supporters of both opposing interests. The resultant compromises have not, of course, produced universal satisfaction, but at least there is certain standardisation of wages, and there are uniform regulations about emergency duties.

Medical Technologists in Southern Africa are undoubtedly better off financially than those in Britain, particularly when the income tax levels in the two regions are compared. And, comparatively speaking, we are probably as well-paid as any group of employees who are performing an essential service to humanity, though it may seem regrettable that in industry, where the primary result of one's work is the financial gain of the employer, the monetary rewards seem inevitably higher. There are, however, considerable variations in the salary scales offered to Medical Technologists by different employing bodies. To a small extent, these variations could be explained by differences in cost of living in different centres, but the marked variations in salaries which are sometimes offered by different services in the same towns undoubtedly justify our working towards a national scheme for the standardisation of salaries. Medical Technology is not a profession which can, in any circumstances, afford to employ second-rate people because the others have been attracted elsewhere by better financial prospects.

The position regarding "on call" duties in South Africa also needs consideration. In Britain, there is a standard rate of pay for time spent in emergency work at the laboratory, while here there is often no material recompense for this type of work. While much may be said in favour of the virtues of self-sacrifice in a worthy cause, we propose that if self-sacrifice is to have any meaning, it must be voluntary; if it is virtually compulsory, it becomes exploitation. It has been suggested that "piecemeal" payment for work may be undesirable, and that appropriate adjustments to the basic salary should be made instead. If this procedure is adopted, the rise in salary should bear a direct relationship to the time when the technologist is first required to be "on call", so that he feels that his added responsibility is duly recognised. A sense of dissatisfaction creates an unhealthy atmosphere in a laboratory.

OBSERVATIONS ON THE STAINING OF E. HISTOLYTICA

M. I. VAN DER LINGEN

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Although it is generally agreed that the staining of biological materials in many cases does not give an entirely true picture of the structures observed, the application of dyeing techniques to biological investigation was a major step forward. Staining methods are now quite indispensable in the routine and research activities of a biological laboratory. A stain may be applied with a number of ends in view. In routine protozoological work the correct identification of an organism is the principal reason for resorting to staining methods. Here we require a dye which will bring up all the structures and will stain a wide variety of organisms. The method used must of necessity be easy to apply and not unduly time-consuming. This type of stain is one that gives a good general picture, but need not bring out the individual structures or components selectively. It is of course a nuclear stain. In practice, we may use a stain applied directly to a wet preparation which is examined at once or make a permanent preparation, dehydrated and mounted, for examination at leisure. It is obvious that for work other than daily routine examinations, the latter is preferable since the preparation may be kept for later reference, comparison and study and, where necessary, may be referred to experts. Briefly, what is required is a method giving, say, a 70 *per cent* clear picture in 95 *per cent* cases—beautiful colour-schemes are not of great value.

The methods used for demonstrations are usually long and painstaking, requiring much practice and skill in getting results. Morphological study of a species requires the same degree of clarity. A method suitable for these purposes must give 100 *per cent* clear pictures and may be expected to do so only 60–70 *per cent* of the time. There is scope here for the elegant colour-scheme. Polychrome methods showing all the structures in different colours and stains, giving striking effects, are useful.

Apart from the above two aspects there are also those techniques which are used to bring out selectively certain intracellular structures and inclusions. In this field also are the cytochemical methods for the identification of enzymes, vitamins and other chemical constituents of the protozoan body. This leads into the exact, quantitative measurement of the various compounds as, for example, the measurement of desoxyribonucleic acid by ultra-violet absorption microscopy.

The suggestions put forward for the vital staining techniques are legion and it appears that a host of dyes or combination of dyes will give some kind of result.

Bucki and Wells (1953) suggest staining faecal preparations with tincture of metaphen. They claim that this brings out nuclear and cytoplasmic detail to a fair degree. However, this method does not seem to have great use in most laboratories, although its ease of application and

the fact that it is more often available where other more complex substances are not, make it useful in emergencies. The same authors (1953 a) also put forward a method utilising a solution of brilliant cresyl blue in methanol. It has been found that this method gives better results when the solution advocated by these authors is very greatly diluted with distilled water, thus reducing the intensity of the otherwise very strong blue colour.

For rapid and satisfactory diagnosis, we have found the M.I.F. stain of Sapero, Lawless and Strome (1951) to be of most value. This staining solution is made up as follows:—

Lugol's Iodine	10 parts
Formaldehyde	15 parts
Tincture of Merthiolate	75 parts

For the best results the following procedure is recommended. A drop of the M.I.F. stain is added on a slide to a drop of distilled water. Freshly-passed faeces are comminuted in the solution and examined under a number one coverslip. The use of a blue filter enhances detail. Cytoplasm takes on at first a yellowish, followed by a salmon pink tinge, while nuclear elements are a brown to jet black colour. Flagella show up well. Both cysts and trophozoites are stained. If ringed these preparations may be kept for some time. The stain must be made up freshly as its staining properties are at its best for only six to eight hours. Lugol's solution should be prepared weekly. This stain is effective in bringing out detail in all protozoan species examined. Degenerate organisms do not, however, stain readily; this itself is an advantage since it may prevent the mis-diagnosis of *Entamoeba histolytica* as *Entamoeba coli* due to pyknotic changes in the nucleus.

This solution has also important possibilities as a preservative for making collections in the field. The merthiolate and formaldehyde are kept mixed in Kahn tubes separate from the iodine and mixed with this when the specimen is obtained. About 0.25 gm. of faeces is mixed in a tube with these constituents and kept thus for later examination. Helminth ova are also preserved and show up effectively for diagnosis.

Aceto-carmine, a dye with wide application in the field of cytogenetics, has been tried as a nuclear stain for protozoa, but without notable success.

Alicna (1952) has used a modified Field's stain which he claims gives good results. Although satisfactory, these results are not quite as reliable in our hands as the M.I.F. method.

It would appear from the variable results obtained with the same dye and from the fact that a variety of dyes may be employed, that the pH of the staining solution of preparations is very largely operative in bringing up nuclear structures. In support of this, it has frequently been found that in direct preparations the nuclear structure of *E. histolytica* is visible. This is explained by the work of Nair (1953) who found that at certain pH levels, various buffer solutions rendered the nuclei of trophozoites and cysts of *E. histolytica* visible and that these levels coincided with the pH of one of the vital stains.

There are many methods available for making permanent preparations for diagnosis. For general purposes the stain most frequently used is the Iron Haematoxylin stain applied in a variety of ways in order to reduce the time involved. Possibly the most critical aspect of good staining with haematoxylin is satisfactory differentiation with iron alum. Different methods have been proposed to obviate the painstaking controlled differentiation. However, many of these methods give such unsatisfactory results that in reality they are most impractical. With practice, proficiency is soon attained and smears may be rapidly stained for diagnostic purposes using the more orthodox procedures. A satisfactory and rapid method, using Iron haematoxylin and Iron alum as a mordant and differentiating solution is as follows:—

1. After removing fixative, bring the smear down to water and wash thoroughly.
2. Mordant in 4 *per cent* aqueous Iron alum for 10 minutes, preferably longer. Wash in distilled water.
3. Stain with 0.5 *per cent* aqueous Iron haematoxylin for half-an-hour, or longer.
4. Differentiate in 2 *per cent* Iron alum under a microscope.
5. Wash in distilled water and take up through alcohols allowing 2 minutes in each.

Haematin, which is actually the active compound of haematoxylin and therefore has more precise staining properties, gives good results. It is used as a one *per cent* solution in 70 *per cent* alcohol, being prepared as required since it does not keep well. Differentiation is effected by a saturated solution of picric acid in rectified spirits, followed by neutralisation with sodium bicarbonate.

The differentiation involved in the Iron haematoxylin staining is obviated by recourse to alum haematoxylin. The recommended stain here is Mayer's haemalum or Mayer's acid haemalum. The smears are left in the staining solution for from five to ten minutes for trophozites and ten to twenty minutes for cysts. After blueing in running water they are dehydrated, cleared in xylol and mounted. However, although in many cases adequate results are obtained one or two trials are usually necessary to determine the time necessary for staining. The precise control of the differentiation in the Iron haematoxylin methods is lacking.

A satisfactory technique which does not require differentiation is given by the use of phosphotungstic acid as a mordant followed by staining in Iron haematoxylin. A modification by Cooper of the original method has proved extremely useful. Smears are fixed, washed and mordanted in 2 *per cent* phosphotungstic acid for from half-an-hour to several hours. They are then transferred without washing to 0.5 *per cent* aq. haematoxylin and stained overnight at 37°C. Nuclear structures are well stained and clear chromidial bodies and other structures such as axostyles of flagella and flagellates usually stand out well.

Curtin (1952) advocates the use of Hansen's Iron Trioxyhematin as a rapid method for diagnosis. This is a mixture of Iron haematoxylin and

ferric ammonium sulphate. Application of this dye requires mordanting in phosphomolybdic acid only, no differentiation being required. However, the results obtained do not seem to render it preferable to any of the other stains mentioned.

A stain which may be used as a rapid method for checking and for the preparation of permanent mounts is Weigert's Iron Haematoxylin. Differentiation may be done under the microscope.

It has been found that Wheatley's modification of a polychrome stain developed by Gomori gives a fair proportion of very elegant results (Wheatley, 1951). Due to its chancey results this stain is not recommended for routine diagnosis. Excellent results are, however, obtainable with tissue sections of amoebic ulcers and cysts, especially those of the smaller species of amoebae and the flagellates. As the formula of the stain may not be widely known it is given below:—

0.6 gm. Chromotrope 2 R (Hopkins and Williams)
0.3 gm. light green SF
0.7 gm. Phosphotungstic acid
1 ml. acetic acid
100 ml. water.

The technique is as follows:—

Fix the smears in Schaudinn's fluid, with or without acetic acid (there would appear to be slightly more shrinkage in the absence of the acid). Thirty minutes is the optimum time for fixation. Sections may be fixed in formal saline and still give good results.

The smears are then taken through iodine-alcohol and alcohol down to water, leaving 2 minutes in each.

After washing in tap water, smears are stained for 20 to 30 minutes, and then transferred directly to 95% alcohol in which they are rapidly rinsed. After being taken through two changes of absolute alcohol (half minute in each) the smears are cleared in xylol for 5 minutes and mounted in Canada balsam.

The karyosome stains a red colour while the peripheral chromatin takes up a colour ranging from red to darkish blue. The cytoplasmic material takes the light green dye or stains a pale pink in cysts and in trophozoites appears a blue colour. Red blood cells show up a bright red colour. This makes diagnosis of *E. histolytica* trophozoites more certain as it is rarely that one finds these in *E. coli*. The overall picture in successfully stained smears is most pleasing and particularly suitable for demonstration and teaching purposes. In many cases shrinkage is caused, possibly by the rapid dehydration. Shrinkage does not seem to occur to a marked degree with the smaller cysts. This stain may be strongly recommended for staining known organisms for demonstration purposes.

Lawless has recently developed a stain for the rapid staining of intestinal protozoa. The formula and method of application is as follows:—

Acetone	25 ml.
Glacic acetic acid	25 ml.
Full strength Formalin	5 ml.
Schaudinn's fluid	445 ml.

Shake well and add:—

Acid fuchsin	0.625 gm.
Fast Green ECF	0.25 gm.

Shake well and keep in a tightly stoppered brown bottle.

Make a thin smear and while it is still wet, cover with staining solution. Heat gently over a flame until steam first rises. Wash immediately in tap water.

Dehydrate as follows:—

50 *per cent* Alcohol	30 secs.
70 " " "	30 secs.
95 " " "	15 secs.
Absolute "	15 secs.
Xylol	one minute

Mount in Balsam.

This method is exceedingly rapid and simple in application. Results are on the whole satisfactory if care is taken in the heating.

While it is true that many hit or miss methods frequently give results, it is only by understanding the rationale of a technique that consistent results are obtained. It must be remembered also that many physio-chemical factors play an important part in the staining process and that where these vary, different effects may be obtained with the same dye.

REFERENCES

ALIGNA, A. D. (1952). *Med. Technicians Bull. Suppl. to U.S. armed Forces med. J.*, **3**, 31.
BUCKI, A. J., and WELLS, W. H. (1953). *Science* **117**, 235.
BUCKI, A. J., and WELLS, W. H. (1953a). *U.S. armed Forces med. J.*, **4**, 1195.
CURTIN, C. B. (1952). *Turtox News* **30**, no. 6.
GRINDLEY, M. F. (1954). *Amer. J. clin. Path.*, **24**, 243.
LAWLESS, D. K. (1953). *Amer. J. trop. Med. Hyg.*, **2**, 1137.
NAIR, C. P. (1953). *Nature* **172**, 1051.
SAPERO, J., LAWLESS, D., and STROME (1951). *Science* **114**, 550.
WHEATLEY, W. B. (1951). *J. clin. Path.*, 990.

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PYRIDIUM—A PITFALL FOR THE MEDICAL TECHNOLOGIST

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"Pyridium" (phenyl-azo-diamino-pyridine hydrochloride) is an antiseptic substance of low toxicity which is rapidly concentrated and excreted by the kidneys and is sometimes given orally as an urinary

antiseptic. It enjoyed wide popularity before the war and then fell into disuse. Lately it seems to have regained something of its former popularity.

Most text-books list pyridium among the drugs that are known to produce abnormal coloration of urine, but less seems to be known about the anomalous chemical reactions produced by this substance, and unless the medical technologist is informed in advance that this drug has been administered, he is likely to be greatly perplexed, especially if it occurs in low concentration.

Over the last two or three months numerous urine specimens have been received in this laboratory which have revealed several puzzling features. These have been found due to the presence of pyridium and it is with the object of drawing the attention of medical technologists to these facts that this brief paper is presented.

When the drug occurs in high concentration it is fairly easy to recognize visually that the urine contains something "rich and strange". The urine is a deep reddish-orange colour and stains heavily any articles or fabrics with which it may come in contact. In low concentrations, however, it is not so easily observed. The urine may appear to be slightly bile-stained, or to contain an excess of urobilin. When shaken the froth retains the colour, and the first few specimens containing the drug that were received in this laboratory were unhesitatingly described as "bile-stained". It came as something of a surprise when confirmatory chemical tests failed to demonstrate the presence of bile. When tested for urobilinogen using the modified Ehrlich reagent (paradimethylaminobenzaldehyde 0.7 gm., concentrated hydrochloric acid 150 ml., distilled water 100 ml.) an intense pink colour was produced which could easily be misread as a strongly positive result. As the Ehrlich test is frequently used as the basis for a rough test for porphobilinogen, false positive results are a matter of considerable gravity. Fehling's Reagent is partially reduced, though the colour thus produced should lead one to suspect that the reducing substance is not true sugar. In high concentrations of the drug the Fehling's Reagent is changed to a dense port-wine colour.

The fact that a marked colour change is produced with Ehrlich's Reagent as described above led to the development of a very simple exclusion test. In view of the fact that the active ingredient of Ehrlich's Reagent (paradimethylaminobenzaldehyde) is dissolved in strong hydrochloric acid, it was decided to see whether any colour change was produced by hydrochloric acid alone. The same dense pink colour was produced. A search through the standard laboratory text-books revealed only one (somewhat misleading) reference to this very useful fact. Duke ("Urine: Examination and Clinical Interpretation", Oxford University Press, 1939) states: "The colour is intensified by the addition of hydrochloric acid." Some exception might be taken to the word "intensified". The colour is not so much intensified as completely changed. The original colour of the urine containing pyridium is orange to reddish-orange depending on the concentration. Acidification

with strong hydrochloric acid changes it to a cochineal pink.

As a result of the observation detailed above, it is now routine practice in this laboratory to check any urines giving a positive Ehrlich test for urobilinogen by acidifying with hydrochloric acid only. Any pink colour thus produced renders suspect the validity of the Ehrlich test.

Martindale (Extra Pharmacopoeia, 22nd Edition, 1941) states that in hyperacidity the dose should be regulated and given **after** meals. It therefore seems possible that the drug may be altered by hydrochloric acid and become more toxic. The colour is certainly altered.

Experiments on normal persons showed that the maximum urinary concentration of pyridium is attained some three hours after the administration of a test dose, and that the urine is completely free of the drug 24 hours after the cessation of treatment. As the concentration diminishes, the colour of the urine rapidly approaches normal, but it should be noted that towards the end of the 24-hour "elimination period" normal-coloured urine is passed which still turns distinctly pink when acidified with hydrochloric acid. It is these specimens that constitute a particular hazard for the unsuspecting technician.

It is stressed that the above data were obtained from experiments on normal individuals. In patients with impaired renal function it is quite possible that elimination of the drug may be prolonged.

I am indebted to Dr. M. M. Friedman for the observation that pharmaceutical firms have recently been sending out generous samples of this drug to medical practitioners. This may well explain the sudden reappearance of the drug in urine specimens. Mr. Malherbe, Senior Pharmacist at the Frere Hospital, states that this drug has been far more widely prescribed over the last few months than formerly.

If these conditions exist in other centres, it clearly behoves medical technologists to keep a wary eye open when encountering anomalous chemical reactions in urine.

SUMMARY

Pyridium is a drug used as an urinary antiseptic. Its presence in high concentration in urine is likely to be readily suspected. In low concentration it may pass undetected and give rise to anomalous chemical findings. A simple method for its detection is described.

ACKNOWLEDGMENTS

I am grateful to Miss E. Mills and Mr. W. Bowen of this laboratory for their assistance.

This paper is presented by permission of the Pathologist and Medical Superintendent, Frere Hospital.

THE TRAINING OF MEDICAL LABORATORY TECHNICIANS IN THE UNION OF SOUTH AFRICA AND GREAT BRITAIN

R. E. SILVERTON

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Following my arrival here in Johannesburg from London, I have been asked many questions from my new colleagues concerning the training and examination system for Medical Laboratory Technicians in Great Britain. I have endeavoured, to the best of my ability, to answer these enquiries and in the belief that other technicians in the Union are similarly interested in the activities of their counterparts in Great Britain, I have been asked to compare the training systems of the two countries.

The system adopted in Great Britain for the training of Medical Laboratory Technicians is based upon the syllabus of their qualifying body, the Institute of Medical Laboratory Technology (I.M.L.T.).

This Institute, founded in 1942, followed in the wake of the parent body, the Pathological and Bacteriological Laboratory Assistants' Association (P.B.L.A.A.) This Association was formed in 1912 to consider the problem of organising laboratory assistants, as technicians were known in those days, into a recognised body. That was forty-three years ago and during the intervening years between the birth of the P.B.L.A.A. and the formation of the I.M.L.T., many difficulties and obstacles had to be surmounted before the Medical Technologist was to receive any form of status. That this status has been acknowledged, is due in no small measure to the formation of the early Association.

The fact that the Institute of Medical Laboratory Technology was conceived and born during the "Dark Days" of 1942, and that the many tedious arrangements were made at a time of great stress, indicates the confidence which the founders had of the ultimate success and survival of the Institute.

The first examinations were introduced by the P.B.L.A.A. shortly after the first world war and were an important step towards the recognition of the merits of the Medical Technologist. Since then the high standard of the examinations have become so well recognised that today the qualifications of the technician determine the position which he holds.

It was, perhaps, the introduction of the National Health Service which, more than any other single factor, brought the I.M.L.T. into its own as a qualifying body.

The Whitley Council, which is the negotiating body responsible for the grading of all technicians employed within the National Health Service in Great Britain, accepted the I.M.L.T. qualifications as the basis for all appointments within that service.

The qualifying examinations of the I.M.L.T. are spread over a period of seven years.

The first examination, the Intermediate, is held bi-annually and is taken after the candidate has had at least three years' experience in the Laboratory, is 19 years of age and has been a member of the Institute for not less than 3 months.

This examination, which is divided into three parts—written, practical and oral—requires a fundamental knowledge of the four basic subjects, viz. Bacteriology, Pathology, Haematology and Bio-chemistry, together also with a basic knowledge of Physiology and Inorganic Chemistry. On passing this examination the candidate is made an Ordinary Member of the Institute and is graded as a Junior Technician.

The Associateship, which is the second examination, is held annually and is open to Ordinary Members of not less than 22 years of age with a total laboratory experience of not less than five years. This examination is similarly divided into three parts but unlike the Intermediate examination the candidate is examined in one of the four major subjects only. The standard expected, however, is extremely high and a very thorough knowledge of the subject concerned is necessary in order to fulfil the requirements of the examiners.

Fellowship of the Institute may be obtained by taking a second subject at an advanced level two years after obtaining the Associateship or alternatively, for those wishing to specialise, by submitting a thesis. The thesis must be written on original work, on some aspect of laboratory technique.

The training system adopted to prepare the candidate for these examinations is usually based upon the following scheme.

The first three years are divided into six periods of six months each.

The Student Technician spends the first six months learning general laboratory procedures such as glass blowing, sterilisation, preparation of hypodermic syringes, the care of animals and such forth. On completing this part of his training he then rotates through each of the major departments spending a training period of six months in each. This brings his service to two and a half years. The final six months before his examination is taken up by a short refresher period in each of the departments. This training is supplemented by a course of evening classes.

If successful in passing the examination the new Junior Technician will have to decide upon a major subject. This choice is frequently influenced by such vacancies as may exist in the laboratory.

Two years' full time training in one subject, plus a further course of evening instruction, usually prepares the candidate for his Associateship immediately that he is eligible to sit for the examination. If successful, the method by which he obtains his Fellowship is decided entirely by him.

Once having obtained his Associateship he is automatically graded as a qualified technician but is free to take up a position in a department other than that in which he qualified, providing that the Pathologist concerned is agreeable. Should he decide to continue working in the

subject on which he has already passed his qualifying examination, he must either train for his second final entirely by attending evening classes or alternatively obtain his Fellowship by submitting a thesis.

How does this system compare with that in operation here in the Union?

I can only speak from the little knowledge that I have of the training of technicians here in Johannesburg.

The system adopted would appear in the main to be very similar, the Student Technician circulating through the various departments over a period of three years and attending evening classes to supplement the experience and knowledge gained. At the end of this period a further two years' experience is necessary before he gains his M.T.

The most important fundamental difference between the two training schemes is that in South Africa the final authority on Medical Technology is the Medical Council whereas in Great Britain it is vested in the Institute of Medical Laboratory Technology.

There are, however, several other points which I have noticed to which I should like to draw attention. The first is the question of sex differentiation.

Although there is no sex differential in South Africa it has been, until recently, impracticable to include female staff in the apprentice scheme of technologist training. Now, however, a training scheme has been introduced at the Witwatersrand Technical College which is open to all student technicians providing that they obtain their practical experience simultaneously in a training centre recognised by the Medical Council.

In Great Britain, similarly, there is no direct sex differential but such indirect differential as exists is in favour of the female staff. This is due to the period of National Service which all young men in the United Kingdom must serve.

The male technician is exempt from National Service until such time as he has sat for his Intermediate examination. He is then obliged to serve a period with the armed forces, while his female counterpart continues her training in the laboratory. The result is that when the young soldier returns to his laboratory work it is to find that he is still a Junior Technician while the girl who started training with him may have gone on to acquire technician status.

This is probably one of several factors which deter many young men in Great Britain from choosing Medical Technology as a career. The female technician is, in most subjects, the equal of the male, but should the present decline in male technicians continue, their stabilising influence will be sorely missed at a future date.

The second observation is on the examination system. In Great Britain the examinations are on a National basis. All written examinations are conducted on the same day at various centres throughout the British Isles. The practical and oral examinations are then held on

consecutive days several weeks later. These are not necessarily held on the same day at all centres and unlike the written examination the questions are not compiled by the Institute but are set by the examiners during the examination. The type of questions asked are nevertheless uniform. Here in the Union the examinations are run entirely under local administration and are not, as yet, organised on a National scale. The Medical Council has, however, recently approved of the setting up of a National Examination Board for Medical Technology.

The third observation is on the support which is given to the Society of Medical Laboratory Technologists of South Africa (S.M.L.T.S.A.).

In Great Britain all members of the laboratory staff join the I.M.L.T. as student members almost immediately that they commence their training. The Institute, therefore, is well supported and this has in no small way influenced the growth of that body.

Many technicians in Johannesburg and no doubt in many other parts of the Union, do not support the S.M.L.T.S.A.

To build up a qualifying body worthy of National recognition is a long and difficult task. It is, however, a task which can be made easier for the men at the helm if they have the support of all whom they are trying to represent.

The S.M.L.T.S.A., although still in its infancy, has already made rapid progress. The continued growth of the body and the part which it will ultimately play in shaping the future of Medical Technologists here in the Union is dependent entirely upon the support which it receives from them now. Those technicians not giving their full support should ask themselves whether or not they are worthy of the profession in which they are employed. They should also consider what they can put into the Association rather than what they can get out of it.

The Medical Technologist holds a responsible position and plays an important part in the fight against disease, and all members of the profession should do their utmost to live up to and further the status obtained to date.

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LABORATORY STANDARD SOLUTIONS

(Synopsis of a talk given by Mr. R. K. Williams, B.Sc., Salisbury Municipal Chemist, to the Salisbury and District Association of Medical Laboratory Technologists, on 23rd June, 1955)

Four main types of standard solutions are used in the laboratory.

(1) **Molar or Formal Solution**

This is the molecular weight in grams, also called the MOL, of any substance in a litre of solution. There is no obvious relationship between molar solutions, as there is between NORMAL solutions.

(2) **Molal Solution**

This is the molecular weight, in grams, in 1000 grams of Solvent.

(3) Particular Standard Solution

This is a solution made up for one particular estimation only. The strength is such as to make calculations easy and quick. For example, for determination of Chlorides in water, the Silver nitrate solution is 4.79 grams $AgNo_3$ per litre, which means that

1 c.c. = 1 milligram of Chlorine as Chloride.

Thus if 100 c.c. of sample is used, the burette reading gives the result directly as parts per 100,000 Chloride, since

parts per 100,000 = mgs. per 100 c.c.

Solutions can be of any strength to suit the particular estimation.

(4) The Normal or Equivalent Solution

This is the most commonly used and the most reliable type of Standard solution. The definition is: "A solution of a reagent that contains one **equivalent** in grams of the substance per litre." This is referred to as an N solution. One can also have an N/10 or N/100 etc. solution and this then contains 1/10 or 1/100 etc. of the weight per litre.

The **equivalent** of any substance is that weight of it which combines with or displaces one part by weight of hydrogen or 8 parts of oxygen or 35.5 parts of Chlorine. So it follows that the equivalent in grams or "gram equivalent" of any substance is that weight in grams that contains or displaces one gram of hydrogen, etc.

The use to which the solution is to be put must be considered, as the same substance can be used for different purposes when the normal solutions will require different weights. For instance:—

(a) Potassium di-chromate may be reacting with a Barium salt, involving direct precipitation of the Barium.
$K_2Cr_2O_7 \rightarrow BaCr_2O_7$
Then 2K = Ba which is equivalent to 2 Chlorine.
Thus $K_2Cr_2O_7$ divided by 2 = one Chlorine = one Hydrogen.
Therefore, in this case a normal solution of $K_2Cr_2O_7$ is 294.18 divided by 2 or 147.09 grams per litre.

(b) However, if Potassium di-chromate is to be used as an oxidising agent in acid solution the following is the case:—
$K_2Cr_2O7 + 5H_2SO_4 \rightarrow 2\,KHSO_4 + Cr_2(SO_4)_3 + 4H_2O + 3\,(O)$.
Here the Chromate contributes 3 oxygens or 48 grams = 6 equivalents of oxygen. Therefore a normal solution (oxidising) is 294.18 divided by 6 = 49.03 grams per litre.

(c) When HCl reacts with a metal it will contribute or contains one equivalent of hydrogen. Thus a normal solution of HCl is 36.5 grams per litre, and 90 cc. of concentrated HCl solution will give a solution a bit stronger than N.

(d) H_2SO_4 contains 2 equivalents of hydrogen, so an N solution is is 49.04 grams per litre. 30 cc. of conc. H_2SO_4 gives a solution a bit stronger than N.

(e) Potassium permanganate is a much used solution, which usually functions as an oxidising agent. In the equation:—

$$2\,KMnO_4 + 4\,H_2SO_4 \rightarrow 2\,KHSO_4 + 2\,MnSO_4 + 3\,H_2O + 5\,(O)$$

it may be seen that of the 8 atoms of oxygen in the $2\,KMnO_4$ only 5 are "Available" for oxidation.

Therefore $2\,KMnO_4$ = 316.1 grams = 80 grams oxygen = 10 equivalents.

Thus Normal Permanganate = $2\,KMnO_4$ divided by 10 = $KMnO_4$ divided by 5.

The usefulness of N solutions is that any given volume of one N solution is equal to the same volume of any other N solution, whether the two solutions will react directly with each other or not, or even when one of the substances does not exist as a solution.

The case of an acid reacting with an alkali is an example of two solutions reacting directly.

An indirect reaction would be the titration of Postassium Permanganate by Thio-sulphate. These two solutions will not titrate directly with each other, but if KI solution is added first to the acidified permanganate the equivalent amount of Iodine is liberated and this then reacts with the thiosulphate, and so the relationship between the thiosulphate and permanganate is established.

The fact that all normal solutions are equal to each other means that the strength of an unknown solution can be determined by reaction with a solution of known strength or the amount of a pure substance in an impure mixture or solution can be estimated.

Preparation of N Solutions

Having found the amount of reagent required, whether from first principles as illustrated by the above equations or from tables, this amount is weighed out accurately or approximately depending upon the substance. It is dissolved in water or another solvent, and when dissolved made up to the mark of the standard flask.

Potassium permanganate of A.R. grade can be weighed out very accurately and the resulting solution should be accurate. It is, however, preferable to standardise it and Sodium oxalate or Ferrous Ammonium Sulphate can be used.

But if an N Solution of Iodine is required, only an approximate weight of iodine can be weighed out as iodine is sufficiently volatile to make accurate weighing impossible. So a bit more than the theoretical amount is taken and the resulting solution is standardised against an N

solution of Arsenious oxide which can be weighed accurately and is very stable in solution.

Now if 10 c.c. of the N Arsenic solution equals 9.5 c.c. of the Iodine solution, the strength of the Iodine will be in the proportion of 10 to 9.5 or $\frac{10}{9.5} = 1.052$ and written as factor 1.052 or f 1.052 N, i.e. stronger than normal. This means that x c.c. of this Iodine solution multiplied by 1.052 will give the volume of exactly N Iodine solution. The Iodine solution can be kept at this strength but it is usually better to add sufficient water to produce an exactly N solution.

The amount of water required is found as follows:—
1 c.c. of existing solution = 1.052 c.c. of accurate N solution.
∴ 1000 c.c. „ „ = 1052 c.c. of accurate N solution.
So if to each 1000 c.c. of existing solution, 52 c.c. of water is added the resulting solution will be an N solution.

Basic Standard N Solutions

In order to prepare various normal solutions, one or two basic solutions are required. HCl Solution is a useful basic solution and after preparation must be itself standardised. Pure Anhydrous Sodium Carbonate can be used to standardise the HCl solution as the carbonate can be accurately weighed. However, an indicator, such as methyl Orange, has to be used and the colour change in this substance is not very easy to detect at the end point.

An indicator considerably better than Methyl Orange consists of:—
0.025 gram Methyl Orange powder
0.125 gram Bromo-Cresol-green powder
dissolved in 25 c.c. Ethyl Alcohol.
The colour change is very sharp and is from yellow to blue.

A more accurate method of standardising the HCl solution uses Calc-spar or Iceland spar, which is a very pure crystalline form of Calcium Carbonate. A small piece is dried and weighed and allowed to react with the HCl solution overnight. About 25 c.c. solution is used. The carbonate is then rinsed, dried and reweighed.

Calcium Carbonate contains two equivalents of Hydrogen so an N solution, if it existed, would contain 50.035 grams per litre.

Therefore 1000 c.c. of an N acid will react with 50.035 grams of $CaCO_3$.

Thus if the HCl solution reacted with, say, 51 grams $CaCO_3$, this acid solution would be $\frac{51}{50}$ or f 1.02 N, and 20 c.c. of water could be added to each 1000 c.c. of the original solution to give an accurate N solution. The use of an indicator is thus unnecessary.

Oxalic Acid is also a common basic acid standard.

Having obtained an N HCl solution, any alkali solution can be standardised against this and from the alkali solutions any other acid solution can be checked.

For oxidation reactions a good basic standard N Solution would be N Arsenious Oxide from which can be checked iodine, Ferrous Ammonium Sulphate, Permanganate, Thiosulphate, etc.

The N solutions are usually too strong for general use, so the N/10, N/20 and N/50 solutions are more commonly employed. These weaker solutions can be prepared from the N solutions by dilution. The acid solutions are very stable, especially if kept in Pyrex type bottles, but the alkali solutions tend to change in strength, due mainly to their reacting with the glass, and so must be re-checked periodically.

Indicators

The two commonest indicators are Methyl Orange, or the improved mixture mentioned above, and Phenol phthalein. They cannot be used in place of each other. When titrating a strong acid with a strong alkali such as Caustic Soda, Methyl Orange must be used; while with a weak acid, usually organic, and a strong base, Phenol phthalein must be used.

The above statements are of a general nature as special cases exist when both are used.

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BRANCH NEWS

NATAL BRANCH

DURBAN

Our September meeting was unique in the history of this Branch in that the Students' Group was completely responsible for the meeting for this month. They put on an excellent show and the most notable feature was a film, entitled "Animals Aid Science", which was produced by the students themselves.

For October we had an interesting and instructive demonstration and talk from Mr. Stuart of the Medical School. He demonstrated the uses of photography with especial reference to Medical Science. Mr. Stuart has promised to write an article for the Journal on this subject.

Dr. E. E. Rosenberg was our lecturer for the November meeting. He explained to members the techniques involved in tissue culture. A review of this talk will appear in a later issue of the Journal.

J. PENDER-SMITH,
Hon. Secretary/Treasurer.

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STUDENTS' SUB-SECTION

During October, the Students' Sub-section went to the Durban City Parliament. In November, a debate was held at the Durban Blood Transfusion Service.

The students have started a fortnightly roneod newspaper known as "The Bacillus", which caters especially for students' interests.

E. F. C. COETZEE,
Student Representative.

EAST LONDON

In common, I expect, with all other laboratories in the country, we received the other day a circular from a well-known firm of scientific instrument manufacturers introducing "Automation" in the form of an imposing-looking piece of apparatus which apparently does everything but type reports.

Now let there be no mistake about it: this heralds the dawn of a new era in medical laboratory technology. The first of these instruments will doubtless reveal many shortcomings, the price will probably be prohibitive, and there will be a good deal of conservative reluctance to have anything to do with these machines. But these difficulties will be surmounted. The first tissue-processing machines had many disadvantages, but they have been overcome and I doubt whether there is a laboratory of any size in this country to-day that does not possess one. And we can expect to have more machinery of that sort in future laboratories.

Though it may be some time before we see any extensive mechanisation of medical laboratory technology, there are already indications of the sort of problems presented by the increasing mechanical complexity of laboratory apparatus. For one thing, mechanisation places our colleagues of the fair sex at a serious disadvantage. I doubt whether many of them, for example, know much about what goes on inside a modern B.M.R. apparatus—and, in any case, most of them would much prefer not to know. Even we males, with our weakness for taking things to bits to see how they work, are finding it something of a strain keeping abreast of the latest mechanical improvements to our instruments. Further mechanisation will almost certainly necessitate the provision of posts for mechanics, engineers and physicists on the establishments of pathology laboratories.

H. FLEETWOOD-HOWARD.

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CAPE BRANCH

On Thursday, July 21st, Professor H. Zwarenstein, M.A., M.Sc. (Cape Town), Ph.D., D.Sc. (Manch.), F.R.S.S.Af., of the Department of Physiology, University of Cape Town, lectured to members of this Branch. Prof. Zwarenstein lectured on pregnancy tests, from those used in Egypt 2,000 odd years ago to the present day *Xenopus* test. The lecturer illustrated his talk with some old prints, and the evening ended with Prof. Zwarenstein's answering questions from members present.

Dr. N. Sapieka, B.A., Ph.D., M.D. (Cape Town), F.R.S.S.Af., of the Department of Pharmacology, University of Cape Town, was our lecturer on Wednesday, August 24th. The attendance was good in spite of the weather. The lecturer dealt in a general manner with plant, insect, animal and chemical poisons. This lecture was illustrated with excellent colour slides. The evening ended with Dr. Sapieka's answering questions.

Our lecturer on October 12th was Dr. R. Singer, M.B., Ch.B. (Cape Town), of the Department of Anatomy, University of Cape Town, whose subject was "Madagascar". This was a combined travel talk and a lecture dealing with the origins of the peoples and animals of the island. The lecturer illustrated his talk with colour films and slides and photographs. Many questions were answered by Dr. Singer after his lecture. Mr. G. van Drunen, of the Department of Physiology, University of Cape Town, showed the films during Dr. Singer's lecture. Our thanks to him for helping to make this a very enjoyable evening.

J. H. MAYTHAM,
Hon. Secretary/Treasurer.

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SOUTHERN TRANSVAAL BRANCH

The names of the office-bearers for the year 1955 to 1956 are—

Chairman: Dr. F. A. Brandt.
Hon. Secretary/Treasurer: Mrs. G. Tomlin.
Committee Members: Messrs. Boardman, Roux, Silverton, Sadler, Miss Widdicombe, Dr. Wolstenholme.
Student Representative: Mr. Lloyd.
National Council Representatives: Dr. Brandt, Mrs. Tomlin, Mr. Roux.

There are now 84 members of this Branch.

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VACANCIES

Advertisements, at a cost of 2/6 a line, are invited for this column.

UNIVERSITY OF THE WITWATERSRAND

Applications are invited from male technologists for appointment to a post of Laboratory Technician, Grade II, in the University Department of Surgery. Applicants will be expected to have had experience in histopathological technique.

The salary scale attached to the post is £550 x 50 — £750, with a married cost of living allowance of £234 per annum. Contributions to the University's Provident Fund are compulsory.

Applications, giving full personal details, qualifications and experience, should be lodged with the Head of the Department of Surgery, University of the Witwatersrand, Milner Park, Johannesburg.

THE SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH

Applications are invited from fully trained laboratory technologists for posts at the above Institute in Johannesburg or in branches to be established in various Transvaal Provincial Hospitals.

Salary will be according to training and experience on the grades £380 x 30 — £500, £540 x 40 — £820 or £860 x 40 — £980 plus a

variable cost of living allowance at present £280 per annum.

Full details of conditions of appointment may be obtained from—
The Manager,
S.A. Institute for Medical Research,
P.O. Box 1038,
JOHANNESBURG.

THE SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH

Applications are invited from suitably qualified persons to take charge, under medical supervision, of the Medium Department of the above Institute. It is desirable that applicants should have a University degree or other recognised qualification such as registration as a Medical Technologist. Training in chemistry will be a recommendation. Applicants must have had previous experience of controlling staff and of running a large Medium Department. Salary according to qualifications and experience on the grades £540 x 40 — £820 or £860 x 40 — £980; in addition, a variable cost of living allowance is payable of £280 per annum. An allowance towards travelling expenses is granted to overseas applicants. For further particulars apply to the Manager, P.O. Box 1038, Johannesburg.

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EXAMINATION SUCCESSES

The following candidates were successful in the Intermediate Examination held in Durban in August, 1955:—

Dixon, M. E.
Dorling, A. E.
Ernst, D. M.
Fernandes, A. C.
Forbes, P. F. V.
Gibson, R. W.
King, P. M.
Metzger, M. E.
Ngqobe, R. T.
Nielsen, B. M.
Owen-Davies, M.
Pirie, K. E.
Shange, T.
Stenhouse, J. M. C.
Stuart, C. R.
Sumner, H. C.
Trezona, M. A.
Vooght, T. E.

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EMBLEM COMPETITION

The winner of the competition for a design for the Society's emblem, notice of which was given in Vol. 1, No. 1 of this Journal, was Miss C. Hodge, Union Health Laboratory, Currie Road, Durban.

Readers will be notified, through the pages of this Journal, when badges become available.

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NOTICE TO CONTRIBUTORS

All contributions are to be addressed to:—The Editor, "The South African Journal of Medical Laboratory Technology", Laboratory, King Edward VIII Hospital, Durban, Natal.

Contributions may be written in English or Afrikaans, and should preferably be typed in double-spacing on foolscap sheets on one side of the paper only.

Figures should be drawn in Indian ink, and all figures and tables should be labelled as such (e.g. Figure 1, Table 1, etc.).

Authors should make adequate references to previous works on their subjects. These should be set out as follows:—Author's surname and initials of Christian names; the year of publication (in parentheses); the name of the journal, which should be abbreviated according to the World List of Scientific Periodicals (see below); the volume number (underlined); and the first page reference.

Example:—Moron, I. B. (1960). J. unsuccess. Med., **20**, 99. References to books should give the author's name and initials, the year of publication, title of book, name of publisher, and town in which published.

References should be arranged in alphabetical order of the authors' surnames. If more than one work by the same author is listed, these should appear in chronological order.

Technologists are reminded that regulations demand that all original articles of a technical or scientific nature must be approved by the heads of their departments before being submitted for publication.

Title abbreviations according to the World List of Scientific Periodicals

All nouns are given capital letters, and adjectives small letters. Articles, conjunctions and prepositions are omitted.

Examples:—

J. Amer. med. Ass.	*S. Afr. J. clin. Sci.*
Lancet	*Stain Tech.*
Amer. J. clin. Path.	*J. Bact.*

REPRINTS AND PHOTOGRAPHS

If requested before publication, 24 reprints of original articles will be supplied free to contributors. As a temporary measure, contributors are asked to defray the costs of publishing photographs accompanying articles.

KENNISGEWING AAN INSENDERS

Alle bydrae moet as volg geadresseer word:—Die Editeur, „Die Suid Afrikaanse Joernaal van Mediese Tegnologie", Laboratorium, King Edward VIII Hospitaal, Durban, Natal.

Bydrae mag in Engels of Afrikaans geskryf word en moet verkieslik getik wees dubbel spasiering op folio-papier en net op een kant van die vel.

Figure moet in Indiese ink geteken word en alle figure en tabelle moet geëtikeer word as sulks (b.v. Figuur 1, Tabel 1, ens.).

Auteurs moet voldoende referensies gee tot vorige werke oor hulle onderwerpe. Die moet as volg uiteengesit word:—Auteur se familienaam en voorletters; die jaar van uitgawe (in hakies); die naam van die Joernaal, wat moet verkort word volgens die Wêreld Lys van Wetenskaplike Tydskrifte (sien hieronder); die volume nommer (onderstreep); en die eerste pagina referensie.

Voorbeeld:—Moron, I. B. (1960). J. unsuccess. Med., **20**, 99. Referensies tot boeke moet die auteur se naam en voorletters meld, die jaar van uitgawe, titel van boek, naam van uitgewer, en stad waar dit gepubliseer is.

Referensies moet in alfabetiese orde, volgens auteurs se familiename gerangskik word. Indien meer dan een werk deur dieselfde auteur gemeld word, moet dit in tydsorde voorkom.

Tegnoloë word daaraan herinner dat regulasies vereis dat alle oorspronklike artikels van tegniese of wetenskaplike aard moet die goedkeuring dra van hulle departementale hoofde voor dit ingestuur word vir publikasie.

Titel verkortings volgens Wêreld Lys van Wetenskaplike Tydskrifte

Alle selfstandige naamwoorde moet begin met hoofletters en byvoeglike naamwoorde met klein letters. Artikels, verbindings en voorsetsels word uitgelaat.

Voorbeelde:—

J. Amer. med. Ass.	*S. Afr. J. clin. Sci.*
Lancet	*Stain Tech.*
Amer. J. clin. Path.	*J. Bact.*

HERDRUKKE EN FOTOGRAWE

Indien aanvraag ingedien word voor publisering, sal 24 herdrukke van oorspronklike artikels vry aan bydraers verskaf word. As in tydelike maatreel word bydraers gevra om die koste van publisering van fotos wat saam met artikels gaan self te betaal.

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